

Leanna L. House

Curriculum Vitae

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Department of Statistics
Virginia Tech
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Education

- Ph.D. in Statistics, Duke University, Durham, NC, 2006
Dissertation: Non-parametric Bayesian Models in Expression Proteomic Applications
Advisors: Dr. Merlise Clyde and Dr. Robert Wolpert
- M.S. in Statistics Duke University, Durham, NC, 2003
Project: Bayesian Identification of Differentially Expressed Genes
Advisor: Dr. Merlise Clyde
- M.A.T. in Curriculum Development, Cornell University, Ithaca, NY, 1999
Advisor: Dr. Avery Soloman
- B.S. in Biometry and Statistics, Cornell University, Ithaca, NY, 1998

Positions

- 2008 - present Assistant Professor, Department of Statistics, Virginia Tech,
Blacksburg, Virginia
- 2006 - 2008 Postdoctoral Fellow for Managing Uncertainty in Complex Models, Department of Mathematical Sciences, Durham University,
Durham, United Kingdom
- 2002 - 2006 Research Assistant, Department of Statistical Sciences, Duke University,
Durham, North Carolina
- 2002 Intern, Battelle Memorial Institute, Columbus, Ohio
- 2000 - 2001 Researcher, Battelle Memorial Institute, Columbus, Ohio
- 1999 - 2000 Research Associate, Battelle Memorial Institute, Columbus, Ohio
- 1999 Laboratory Technician, Department of Soil and Crop Sciences,
Cornell University, Ithaca, New York

Research Interests

Bayesian statistical modeling with an emphasis in model averaging, kernel regression, and Bayes linear; Uncertainty analysis of computer models/experiments; Data mining coupled with data visualization that promotes human-data interaction and education in Statistics; Applications in proteomics, bioinformatics, cosmology, climatology, and hydrology.

Funded Research

- NSF #1447416 (2014-2017). BIGDATA: F: DKA: Usable Multiple Scale Big Data Analytics Through Interactive Visualization. *National Science Foundation, Division of Information and Intelligence Systems*, PI: North, C., Co-PI: Chao, Y., House, L., Leman, S.C., \$998,912(Co-PI, 25%).
- ONR # N00014-14-1-0719 (2014-2015). Data Analytics For Large Acoustic Array Datasets. *Office of Naval Research, Basic and Applied Scientific Research*, PI: Smith, E., Co-PI: Alexander, W.N., Devenport, W., House, L., Leman, S.C., \$44,281(Co-PI, 16%).
- ICAT-ICTAS (2014-2015). Be the Data: Embodied Interaction in Bayesian Visual Analytics. *VT's Institute for Creativity, Arts, and Technology (ICAT) - Institute for Critical Technology and Science Technology (ICTAS) SEAD (Science, Engineering, Art, and Design) Proposal - Data Exploration*, PI: House, L., Co-PI: Chao, Y., Leman, S.C., North, C., Abel, T., \$30,000(PI, 20%).
- NSF #1141096 (2013-2015). Critical Thinking with Data Visualization. *National Science Foundation, Division of Undergraduate Education*, PI: House, L., Co-PIs: Leman, S.C., McConnell, K., North, C., Ramakrishnan, N., \$199,826(PI, 25%).
- NSF #1136640 (2012-2016). Dimensions: Collaborative Research: Diversity and Symbiosis: Examining the Taxonomic, Genetic, and Functional Diversity of Amphibian Skin Microbiota. *National Science Foundation, Division of Environmental Biology*, PI: Belden, L. Co-PI: House, L., Jensen, R., Harris, R.N., Minbiole, K.P., \$1,205,921(Co-PI, 25%).
- NSF #0937071 (2009-2013). Bayesian analysis and visual analytics. *National Science Foundation, Computer and Communications Foundations*, PI: Leman, S.C, Co-PI: House, L., North, C., \$499,307(Co-PI, 40%).
- NSF Contract (2010). User-Guided Spatialization for Visualizing NSF Award Portfolios. *National Science Foundation*, PI: North, C., Co-PI: House, L., Leman, S.C., \$24,999(Co-PI, 33%).
- USDA-VT (2010-2012). Systems Biology of Metabolic Regulation for Rational Metabolic Engineering in Soybean Seeds. *United States Department of Agriculture and Virginia Tech College of Agriculture and Life Sciences Internally Allocated Funds*, PI: Collakova, E., Co-PI: House, L., \$61,000(Co-PI, 50%).
- Pratt & Whitney, Center for Excellence (2009). Design of Variation: Data Matching/Large Model Method. *Pratt & Whitney Partnered with Virginia Tech*, PI: House, L., \$17,364(PI, 100%).

Edited Books or Book Chapters

- House, L. and Smith, E. (2014). To Advance Science, Improve Community, and Develop Critical Thinking. In Vaidya, K., editor, *Why Study Statistics?* University of Canberra, To Appear.

- Clyde, M., House, L., and Wolpert, R. (2006). Nonparametric Models for Proteomic Peak Identification and Quantification. In Do, K., Muller, P., and Vannucci, M., editors, *Bayesian Inference for Gene Expression and Proteomics*, New York. Cambridge University Press.
- Banks, D., House, L., McMorris, F., Arabie, P., and Gaul, W., editors (2004). *Classification, Clustering, and Data Mining Applications*. Springer-Verlag Inc, Berlin.

Peer Reviewed Publications

- House, L., Leman, S., and Han, C. (2014). Bayesian Visual Analytics (BaVA). *Journal of Statistical Analysis and Data Mining*, To Appear.
- Han, C., Leman, S., , and House, L. (2014). Covariance-Guided Mixture Probabilistic Principal Component Analysis (C-MPPCA). *Journal of Computational and Graphical Statistics*, To Appear.
- Bradel, L., North, C., House, L., and Leman, S. (2014). Multi-Scale Semantic Interaction for Text analytics. In *IEEE Symposium on Visual Analytics Science and Technology 2014, November 9-14, Paris, France*, pages 163–172.
- Liao, H., Krometis, L. H., Hession, W. C., House, L. L., Kline, K., and Badgley, B. D. (2014). Hydrometeorological and Physicochemical Drivers of Fecal Indicator Bacteria in an Urban Stream Bottom Sediments. *Journal of Environmental Quality*, 43(6):2034–2043
- Walke, J., Becker, M., Loftus, S., House, L., Cormier, G., Jensen, R., and Belden, L. (2014). Amphibian Skin May Select for Rare Environmental Microbes. *Journal of the International Society for Microbial Ecology*, 8:2207–2217.
- Leman, S., House, L., Szarka, J., and Nelson, H. (2014). Life on the Bubble: Whos In and Whos Out of March Madness? *Journal of Quantitative Analysis of Sports*, 10(3):315–328.
- Hu, X., Bradel, L., Maiti, D., House, L., North, C., and Leman, S. (2013). Semantics of Directly Manipulating Spatializations. *IEEE Transactions on Visualization and Computer Graphics*, 19(12):2052–2059.
- Rougier, J. C., Goldstein, M., and House, L. (2013). Second-Order Exchangeability Analysis for Multimodel Ensembles. *Journal of the American Statistical Association*, 108(503):852–863.
- Gudmestad, A., House, L., and Geeslin, K. (2013). What a Bayesian Analysis Can Do for SLA: New Tools for the Sociolinguistic Study of Subject Expression in L2 Spanish. *Language Learning*, 63(3):371–399.
- Leman, S. C., House, L., Maiti, D., Endert, A., and North, C. (2013). Visual to Parametric Interactions (V2PI). *PLoS ONE*, 8(3):e50474.
- Leman, S. C. and House, L. (2012). Improving Mr. Myagi’s Coaching Style: Teaching Data Analytics with Interactive Data Visualizations. *Chance*, 25(4):4–10.
- House, L. (2011). Verifying Reification with Application to a Rainfall–Runoff Computer Simulator. *Journal of Agricultural, Biological, and Environmental Statistics*, 16(4):513–530.

- Endert, A., Han, C., Maiti, D., House, L., Leman, S., and North, C. (2011). Observation-Level Interaction with Statistical Models for Visual Analytics. In *Visual Analytics Science and Technology (VAST), 2011 IEEE Conference*, pages 121–130.
- Tawfik, A. M., Szarka, J., House, L., , and Rakha, H. (2011). Disaggregate Route Choice Models Based on Driver Learning Patterns and Network Experience. In *Intelligent Transportation Systems (ITSC), 14th International IEEE Conference*, pages 445–450.
- House, L., Clyde, M. A., and Wolpert, R. L. (2011). Bayesian Nonparametric Models for Peak Identification in MALDI-TOF Mass Spectroscopy. *The Annals of Applied Statistics*, 5(2B):1488–1511.
- Banks, D., House, L., and Killourhy, K. (2009). Cherry-Picking for Complex Data: Robust Structure Discovery. *Philosophical Transactions of the Royal Society, Series A*, 367:4339–4359.
- House, L., Clyde, M. A., and Huang, Y. T. (2006). Bayesian Identification of Differential Gene Expression Induced by Metals in Human Bronchial Epithelial Cells. *Bayesian Analysis*, 1(1):105–120.
- House, L. and Banks, D. (2004). Cherry-Picking as a Robustness Tool. In *Classification, Clustering, and Data Mining Applications*, pages 197–206, Berlin. Springer-Verlag Inc.
- House, L. and Banks, D. (2004). Robust Multidimensional Scaling. In Antoch, J., editor, *COMPSTAT 2004 Proceedings in Computational Statistics*, pages 251–259, Berlin. Physica-Verlag HD.

Non-Peer Reviewed Publications

- House, L. and Leman, S. (2014). Analytical Attire. In *AMSTAT News*, volume 439, pages 32–33. American Statistical Association.
- Endert, A., North, C., Leman, S., House, L., Han, C., Maiti, D., and Roberts, L. (2009). User-Guided Spatialization for Visualizing NSF Award Portfolios. Technical report, Virginia Tech.
- House, L. (2009). An Application of Reification to a Rainfall -Runoff Model. Technical report, Internal Report for the Research Group, Managing Uncertainty in Complex Models, Sheffield, England.
- Clyde, M., House, L., Tu, C., and Wolpert, R. (2005). Bayesian Nonparametric Function Estimation Using Overcomplete Representations and Lévy Random Field priors. *Statistische und Probabilistische Methoden der Modellwahl*, Oberwolfach Report 47(<http://www.ems-ph.org/journals/owr/owr.php>):2628–2633.

Publications in Progress

- Han, C., House, L., and Leman, S. (2014). Expert-Guided Generative Topographical Modeling with Visual to Parametric Interaction. *PLoS ONE*, Submitted.

- Franck, C., Koffarnus, M., House, L., and Bickel, W. (2014). Accurate Characterization of Delay Discounting: a Multiple Model Approach Using Approximate Bayesian Model Selection and a Unified Discounting Measure. *Journal of the Experimental Analysis of Behavior*, Submitted.
- Seitz, J., Seitz, N., House, L., Leman, S., and North, C. (2014). Improving Students Cognitive Dimensionality Through Education with Object-Level Interaction. Technical report, Virginia Tech, In Progress.
- Belden, L., Hughey, M., Rebollar, E., Umile, T., Loftus, S., Burzynski, E., Minbirole, K., House, L., Jensen, R., Becker, M., Walke, J., Medina, D., Ibáñez, R., and Harris, R. (2014). Structure-Function Relationships in the Amphibian Skin Microbiome. Technical report, Virginia Tech, In Progress.
- House, L., Goldstein, M., and Vernon, I. (2014). Multi-Deterministic and Second-Order Exchangeable Functions. Technical report, Virginia Tech, In Progress.

Seminars

- “Bayesian Visual Analytics (BaVA): In Practice and in the Classroom.” University of Minnesota, School of Statistics, Minneapolis, MN, September 2014.
- “Visual to Parametric Interaction: Including the Expert in Exploratory Data Analyses.” George Mason University, Department of Statistics, Fairfax, VA, October 2013.
- “Second-Order Exchangeable Functions and Multi-deterministic Computer Models.” Simon Fraser University, Department of Statistics and Actuarial Science, Vancouver, Canada, December 2010.
- “Second-Order Exchangeable Functions within Application to Multi-deterministic Computer Models.” Brigham Young University, Department of Statistics, Provo, UT, October 2010.
- “Bayesian Visual Analytics (BaVA): A New Way to Enhance Sense-making.” Los Alamos National Laboratory, Statistical Sciences Group, Los Alamos, MX, May 2010.
- “Bayesian Assessment of System Condition Uncertainty in Computer Models.” Cornell University, Department of Operations Research, Ithaca, NY, November 2009.
- “Functional Data Analysis Using A Lévy Random Fields Model for Multi-spectra Peak Identification and Classification.” Dortmund University, Dortmund, Germany, July 2007.
- “Bayesian Identification of Differential Gene Expression Induced by Metals in Human Bronchial Epithelial Cells.” Environmental Protection Agency, Human Health Division, Chapel Hill, NC, February 2003.

Conference and Workshop Talks

- “Visual Analytics in the Classroom: Developing Analytical Skills While Interacting with Data.” MeetUp discussion leader at the Visual Analytics Science and Technology (VAST), 2014 IEEE Conference, Paris, France, November, 2014.

- “Teaching Introductory Statistics from a Bayesian Perspective.” Roundtable discussion leader at the Joint Statistical Meetings, Montreal C.A., August, 2014.
- “Expert-Guided Generative Topographical Mapping with Visual to Parameteric Interaction.” Invited speaker in organized session at the Joint Statistical Meetings, Montreal C.A., August, 2013.
- “Assessing Simulator Uncertainty Using Evaluations From Several Different Simulators.” Invited Talk, Spring Research Conference, Chicago, Illinois; June 2011.
- “Assessing Simulator Uncertainty Using Evaluations From Several Different Simulators.” Invited Talk, Accelerating Industrial Productivity via Deterministic Computer Experiments and Stochastic Simulation, Isaac Newton Institute for Mathematical Sciences, Cambridge, United Kingdom; September 2011.
- “Bayesian Visual Analytics (BaVA).” Invited Co-Speaker for SAS M2011 Data Mining Conference; October 2010.
- “An Application of Reification to a Rainfall-Runoff Computer Model.” Invited Speaker for Subjective Bayes Workshop at Warwick University, United Kingdom; December 2009.
- “Second Order Exchangeable Emulators to Assess Initial Condition Uncertainty.” Contributed Speaker for Spring Research Conference on Statistics in Industry and Technology, Vancouver, CA May 27 - 29, 2009.
- “An Application of Reification to a Rainfall-Runoff.” Topic Contributed talk (Statistics for Climate Models) at Joint Statistical Meetings, Washington D.C., August 1-6 2009.
- “Learning About Complex Physical Systems from Multiple Computer Models.” Topic Contributed talk (Bayesian Philosophies and Practicalities) at Joint Statistical Meetings, Denver, CO August 2008.
- “Second Order Exchangeable Emulators to Assess Initial Condition Uncertainty.” Young investigator presentation at Bayesian Workshop for Calibration and Validation of Computer Computer Models, Macquarie University, Sydney, 27 - 28 July 2008.
- “Functional Data Analysis Using A Lévy Random Fields Model for Multi-spectra Peak Identification and Classification” Contributed Speaker at the Workshop on Bayesian Nonparametric Regression: theory methods and applications, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK August 2007.
- “Computer Model and Bayes Linear Discussion.” Discussion leader at Dortmund University, Dortmund, Germany, July 2007.
- “Mass Spectrometry Feature Extraction for Expression Proteomic Applications Using a Lévy Random Fields Model.” Invited Speaker at the Workshop on Statistical Bioinformatics and Stochastic Systems Biology, Newcastle, United Kingdom, April 2007.
- “A Bayesian, Nonparametric Approach for Expression Proteomic Analyses.” Topic Contributed (High Dimensional Modeling and Model Selection) talk at Joint Statistical Meetings, Seattle, WA, Aug. 2006.

- “What Do Students Remember from Statistics Class?” Invited talk (Measurement Issues in Statistical Education) at Joint Statistical Meetings, Minneapolis, MN, Aug. 2005.
- “Bayesian Nonparametric Approach for Analyzing Mass Spectrometry Data.” Topic Contributed talk (NISS/SAMSI on Data Mining) at Joint Statistical Meetings, Toronto, Canada, Aug. 2004.
- “Cherry Picking: Multidimensional Perspective.” Invited Session Speaker as Quality and Productivity Research Conference, Research Triangle Park, NC, May 2004.
- “Bayesian Identification of Differential Gene Expression Induced by Metals in Human Bronchial Epithelial Cells.” Contributed talk at Joint Statistical Meetings, San Francisco, CA, Aug. 2003.

Poster Presentations

- “How We Think Matters; Using Bayes to Improve Cognitive Dimensionality.” ISBA World Meeting, Cancun, Mexico, July 2014.
- “Critical Thinking with Data Visualization.” ISBA World Meeting, Kyoto, Japan, June 2012.
- “Bayesian Visual Analytics”, Case Studies in Bayesian Statistics and Machine Learning, Pittsburgh, USA, November 2011.
- “Reinforcing Reification with Application to a Rainfall-Runoff Computer Model.” Valencia 8, World Meeting on Bayesian Statistics, Benidorm, Spain, June 2010.
- “Learning About Complex Physical Systems from Multiple Computer Models” ISBA World Meeting, Hamilton Island, Australia, July 2008.
- “Expression Proteomic Analysis using Marked Point Processes.” Valencia 8, World Meeting on Bayesian Statistics, Benidorm, Spain, June 2006.
- “Bayesian Nonparametric Approach for Analyzing Mass Spectrometry Data.” ISBA World Meeting, Viña del Mar, Chile, May 2004.
- “Empirical Bayes Analysis of Microarray Data.” Valencia 7, World Meeting on Bayesian Statistics, Tenerife, Spain, June 2002.

Appearances in Media

- University of California Los Angeles (UCLA), The Daily Bruin, Mar. 17, 2015, “Q&A: Statistics analyst talks prestige bias in March Madness”, <http://dailybruin.com/2015/03/17/qa-statistics-analyst-talks-prestige-bias-in-march-madness/>.
- The Oklahoman, Feb. 27, 2015, “NCAA Tournament: Evidence Says Name Brand Programs Will Get the Selection Committee’s Nod Every Time”, <http://newsok.com/ncaa-tournament-evidence-says-name-brand-programs-will-get-the-selection-committees-nod-every-time/article/5397173>.

- ASA News Release, Feb. 24, 2015, “A Marquee Bias Can Influence Which ‘Bubble’ Teams Get Into March Madness”, <http://www.amstat.org/newsroom/pressreleases/2015-Marquee-FactorHelpsTeamsGetintoMarchMadness.pdf>.
- Sports Are 80 Percent Mental, Mar 3, 2011, “Is There Bias In Selection Of March Madness Teams?” by Dan Peterson; <http://blog.80percentmental.com/2011/03/is-there-bias-in-selection-of-march.html>
- fromtheeditr, March 2, 2011, “The Bias Behind ‘Bracketology’; A Study” by Dan Smith; <http://fromtheeditr.blogspot.com/2011/03/bias-behind-bracketology-study.html>
- WSLN, Channel 10, Roanoke, VA, March 2, 2011 “Stats professors: Virginia Tech up against odds for NCAA tourney bid” by Ken Heineck
- WDBJ, Channel 7, Roanoke, VA, March 1, 2011 “Calculating VT’s odds of making the NCAA Tournament Could biases have affected VT getting a bid in 2010?”
- Virginia Tech News, March 1, 2011, “March Madness: Statisticians quantify entry biases,” by Catherine Doss

Also appeared:

- MSN Fox Sports, <http://msn.foxsports.com/collegebasketball/story/MARCH-MADNESS-STATISTICIANS-QUANTIFY-ENTRY-BIASES-69543943>
- Science Daily, www.sciencedaily.com/releases/2011/03/110301111259.htm
- Science Blog, <http://scienceblog.com/43241/march-madness-statisticians-quantify-entry-biases/>
- Science Newsline Medicine, <http://www.sciencenewsline.com/medicine/2011030112000067.html>
- Red Orbit, http://www.redorbit.com/news/sports/2005304/march_madness_statisticians_quantify_entry_biases/
- Tech Talk Live, February 28, 2011, Mentioned by Coach Seth Greenberg during an interview with Bill Roth
- College of Science Magazine, Virginia Tech, September 13, 2010, “Statisticians help researchers see their data in a new way,” by Catherine Doss
- College of Science Magazine Video, Virginia Tech; <http://www.science.vt.edu/media/statistics-house-leman-video.html>
- The Washington Post, March 17, 2010, “Hokies turn to statistic for answers to NCAA snub,” by Mark Viera; http://voices.washingtonpost.com/hokies-journal/2010/03/hokies_turn_to_statistic_for_a.html#more
- Richmond Times Dispatch, Mar 16, 2010, “Virginia Tech stats professors doing NCAA tournament study for Greenberg,” by Darryl Slater; http://www.mytimesdispatch.com/index.php/sports/comments/virginia_tech_stats_professors_doing_ncaa_tournament_study_for_greenberg/11450/

Teaching

- Team-Professor for ISC 1(2)115/1(2)116: Integrated Science Curriculum, Virginia Tech
- Team-Professor for CMDA/STAT/CS 3654: Introductory Data Analytics and Visualization, Virginia Tech
- Professor for STAT 4214/5214G: Methods of Regression Analysis, Virginia Tech
- Professor for STAT 4444/5444G: Applied Bayesian Statistics, Virginia Tech
- Professor for STAT 5365: Hierarchical Models, Virginia Tech
- Tutor for Calculus/Probability, Durham University, United Kingdom
- Teaching Assistant for Intro. Statistics, Duke University
- Statistics Tutor in Center for Learning and Teaching, Cornell University
- Teaching Assistant for pre-calculus in Department of Education, Cornell University

Service

- Feb. 2015-Present, Member of Program Committee for VAST 2015
- Feb. 2014-Nov. 2015, Member of Program Committee for VAST 2014
- Fall 2013-Present, Co-organized student talks for Corporate Partners Event, Virginia Tech
- Aug. 2012-Present, Advisor for Stream Research, Education, and Management (StREAM)
- Aug. 2012-Present, Mentor for the Curie Living Center, Virginia Tech
- Aug. 2012-Present, Member of College of Science Curriculum Committee, Virginia Tech
- Aug. 2012-Present, Co-Coordinator of undergraduate statistics, Virginia Tech
- Aug. 2012-Present, Head of Statistics Undergraduate Committee, Virginia Tech
- June 2012-Present, Junior lead of committee to develop a new undergraduate degree for in the College of Science, Virginia Tech
- June 2011-Present, Serve on committee to develop an Integrated Science Curriculum (ISC) for undergraduate students at Virginia Tech
- Aug. 2009-Present, Coordinator for Women in Statistics Events at Virginia Tech
- Aug. 2013-2014, Member of University Council
- Oct. 2010-Mar. 2011, Served on review panel for the 2011 international conference on Artificial Intelligence and Statistics (AISTATS)
- Aug. 2008-May 2010, Co-organizer for Virginia Tech Colloquia Series
- Reviewed for *JASA*, *Bayesian Analysis*, *Bioinformatics*, *Environmetrics*, *Technometrics*, *Journal of Statistics Education*, *Visual Analytics Science and Technology Conference (VAST)*

Memberships

- American Statistical Association
- International Society for Bayesian Analysis